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(71) Applicant: ISOVER SAINT-GOBAIN [FR/FR]; Les Miroirs, 18, avenue d'Alsace, F-92400 Courbevoie (FR).

(72) Inventor: HORRES, Johannes; Am-Hinteren-Rindweg 25, D-68526 Ladenburg (DE).

(74) Agents: HERRMANN-TRENTEPOHL, W. et al.; Forstenrieder Allee 59, D-81476 München (DE).

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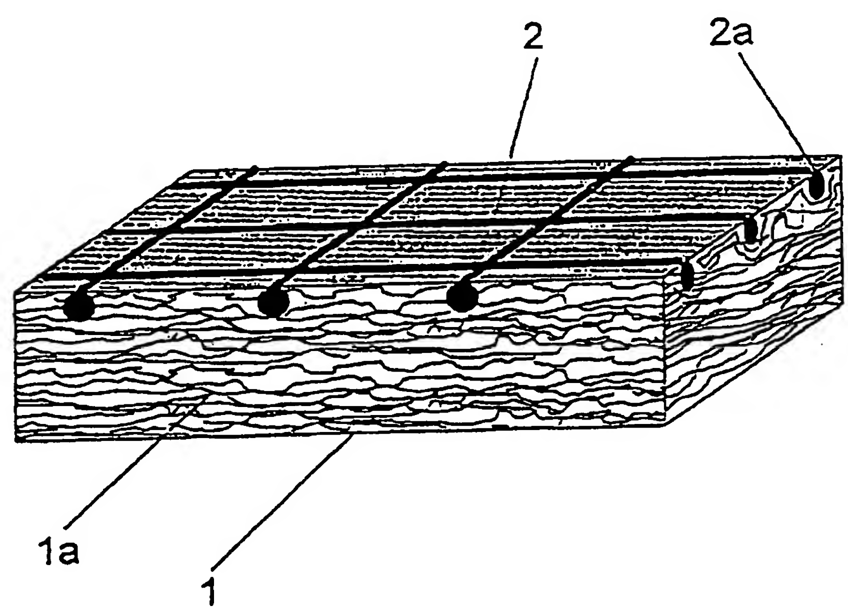
(54) Title: A MINERAL WOOL INSULATION BOARD AND A METHOD FOR PRODUCING THE SAME



(57) Abstract

In a mineral wool insulation board stiffened by an open-pore, flat formation, the open-pore formation is embedded in the surface of the insulation board with positive locking, the mineral wool being pressed into the cavities of the open-pore formation in the surface area of the insulation board.

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A mineral wool insulation board and a method for producing the same

The present invention relates to a mineral wool insulation board and to a method for producing the mineral wool insulation board according to the preambles of claims 1 and 6.

Such mineral wool insulation boards are used in particular for thermal insulation of flat roofs, for facade facings or for lining walls and ceilings of buildings. Such insulation boards are chiefly an integrated part of an interlinked heat system, the boards being fastened to walls, ceilings and facades using suitable fastening elements such as dowels and the like, and a plaster system then being applied to the boards. With such a use of insulation boards a sufficient surface stiffness of the boards is desired to facilitate their handling on the spot, but in particular also for receiving the tensile and pressure loads that act on the boards due to wind suction forces on facades or due to subsequently applied plaster systems. In particular when the boards are used for insulating roofs, in particular flat roofs, it is also desirable to be able to walk on the mineral wool boards, for which purpose they are designed accordingly in terms of strength and compressed accordingly to attain high surface stiffness.

To strengthen the surface of mineral wool insulation boards it is known (DE-AS-1 186 613) to apply a cover layer consisting of prebound glass fibers to the mineral wool foundation, apply additional binding resin to the mineral wool foundation and prebound cover layer, and guide the formation consisting of mineral wool foundation and applied cover layer through a pressing unit. However it has turned out that these mineral wool insulation boards do not meet today's requirements for surface strength and in particular the cover layer can easily come off. Furthermore the high consumption of binding resin is a disadvantage.

Also, DE-A-42 05 380 discloses a product for insulation, in particular a glass wool mat, which is provided with at

Also, DE-A-42 05 380 discloses a product for insulation, in particular a glass wool mat, which is provided with at least one air-permeable cover layer of porous gauze. The gauze is applied to a main surface of the mat by depositing the produced glass wool on the gauze directly in the fall shaft. The glass fibers are thereby connected with one another and with the porous cover layer by means of a thermosetting binder. The method and product disclosed in this document also fail to solve the abovementioned problem. The stiffness-increasing effect is limited and the cover layer can come off the glass wool mat under tensile and pressure stresses.

The problem of the invention is to provide with simple measures a mineral wool insulation board with high surface stiffness which can absorb comparatively high pressure and tensile forces so as to prevent for example an unbuttoning or tearing out of fastening means such as dowels and the like which are used for fastening insulation boards to walls, ceilings and facades of buildings.

This problem is solved according to the invention by the features contained in the characterizing part of the claim, a suitable method for producing such a mineral wool insulation board being determined by the measures in the characterizing part of claim 5. Expedient developments of the invention are characterized by the features contained in the subclaims.

According to the invention a mineral wool insulation board is stiffened on one or both main surfaces by an open-pore, flat formation which spans the particular main surface of the board, the open-pore formation being embedded in the surface of the board with positive locking, the cavities of the open-pore formation being simultaneously backfilled by the mineral wool of the board in the near-surface areas. Embedding the open-pore formation by pressing it into the surface layer of the mineral wool body produces a both positive and nonpositive compound of the open-pore formation with the mineral wool body, whereby the pressure forces acting on the mineral wool insulation board under load are distributed uniformly over a sufficiently large surface and the embedded

cross strands with a sufficient grid width to permit suitable backfilling of the grid spaces for the positive and nonpositive lock. A suitable formation is in particular a wire net as is used for example for rabbit hutches and the like.

According to the invention the mineral wool insulation board is obtained by pressing the stiffening material into its surface. This is preferably done during production of the mineral wool insulation boards themselves, whereby in a preferred embodiment of the production method a sheet of mineral wool or several superimposed layers of mineral wool are compressed within a creper. This results in a gradual longitudinal compression which is obtained by the speed of passage through the creper being lower than the speed of preceding feed of mineral wool fiber layers, and pressure being additionally exerted on an upper band and/or lower band of the creper, thereby compacting the compressed mineral wool further. Before the sheet of mineral wool runs into the creper the stiffening material to be applied to the surface of the mineral wool body is fed to the sheet of mineral wool. The stiffening material can be fed from above or from below with respect to the sheet of mineral wool. It is likewise possible to feed stiffening material to the sheet of mineral wool from both sides so that the mineral wool is sandwiched between the layers of stiffening material. Due to the compression and compacting of the sheet of mineral wool the fibers tend to escape. This escaping material passes into the spaces in the arriving stiffening material during compression or compacting, thereby resulting in a firm, positive and nonpositive compound between the forming mineral wool body and the stiffening material. The inventive method for producing the mineral wool insulation board with at least one stiffened surface within an already existing production step obtains a product improvement without requiring any high additional investment. One thus not only obtains high-quality products whose stiffening layer cannot come off the actual mineral wool body, but also saves additional working steps such as spraying an additional binder, which in particular lowers the fire load of the final product.

ditional binder, which in particular lowers the fire load of the final product.

In the following some preferred embodiments of the invention will be described with reference to the drawing, in which:

Fig. 1 shows a schematic, perspective view of a detail of an inventive mineral wool insulation board;

Fig. 2 shows a schematic view of the production method for the inventive mineral wool insulation board.

Fig. 1 shows a schematic view of a detail of inventive mineral wool insulation board 1 in the surface of which gridlike stiffening material 2 consisting of parallel longitudinal strands and perpendicular cross strands is embedded in uniform arrangement. An especially suitable grid is for example one with diagonally extending strands limiting lozenged openings therebetween. One can clearly see how fibers 1a of the inventive mineral wool body embrace individual components 2a of the stiffening material so that a positive compound arises. The grid is embedded within the insulation board in such a way that the outer surface of the embedded grid along with the mineral wool areas backfilling the grid spaces limit the outer surface of the insulation board. In the embodiment shown, the longitudinal and cross strands have a thickness of about 2 mm with a board thickness of 40 mm, the distance between the cross struts being about 12 mm and that between the longitudinal struts about 20 mm.

Fig. 2 shows a preferred embodiment of a method for producing the inventive mineral wool body with a stiffened surface. Mineral fibers 1a are fed in layers by transport bands 3 to creper 4, 4a and passed on from there to removing device or recompacting device 5 in the area of the curing furnace. The speeds of the various successive steps decrease so that at least V3 > V4 holds. The speed difference between V3 and V4 already obtains a compression and compacting of the mineral fiber layers. Pressure P is additionally exerted on the compressed mineral fiber layers via the upper band of creper 4a, which leads to further compacting. At the same time as the mineral wool fiber layers, strengthening material 2 is

pacting. At the same time as the mineral wool fiber layers, strengthening material 2 is introduced into the creper so that mineral fibers 1a come to lie on this strengthening material. Due to the compacting and the additional pressure via the upper band of creper 4a the strengthening material is pressed into at least one surface of the compacted mineral fiber material and connected positively therewith. When the pressed mineral fiber material connected with the strengthening material leaves the curing furnace via transport bands 5, it constitutes finished mineral wool fiber product 1.

Claims

1. A mineral wool insulation board or sheet which is stiffened by an open-pore, flat formation spanning at least one main surface of the insulation board, characterized in that the open-pore formation (2) is embedded in the surface of the insulation board with positive locking, the mineral wool being pressed into the cavities of the open-pore formation in the surface area of the insulation board.

2. The insulation board of claim 1, characterized in that the open-pore formation is formed by a wide-meshed formation, preferably by a net- or gridlike stiffening material.

3. The insulation board of claim 1 or 2, characterized in that the stiffening material is formed from plastic or wire.

4. The insulation board of any of the above claims, characterized in that the open-pore formation is pressed in with the mineral wool body being pressed or compressed in the surface thereof, thereby filling the cavities or spaces in the formation with mineral wool.

5. A method for producing the mineral wool insulation board of claims 1 to 4, characterized in that one or more superimposed sheets of mineral wool with an open-pore formation placed on at least one main surface are guided through an apparatus exerting compressing forces, preferably a creper.

6. The method of claim 5, characterized in that at the same time as the sheet of mineral wool is compacted and compressed it is pressed together with the supplied stiffening material within the creper, resulting in a positive connection between mineral wool body and stiffening material.

Fig. 1

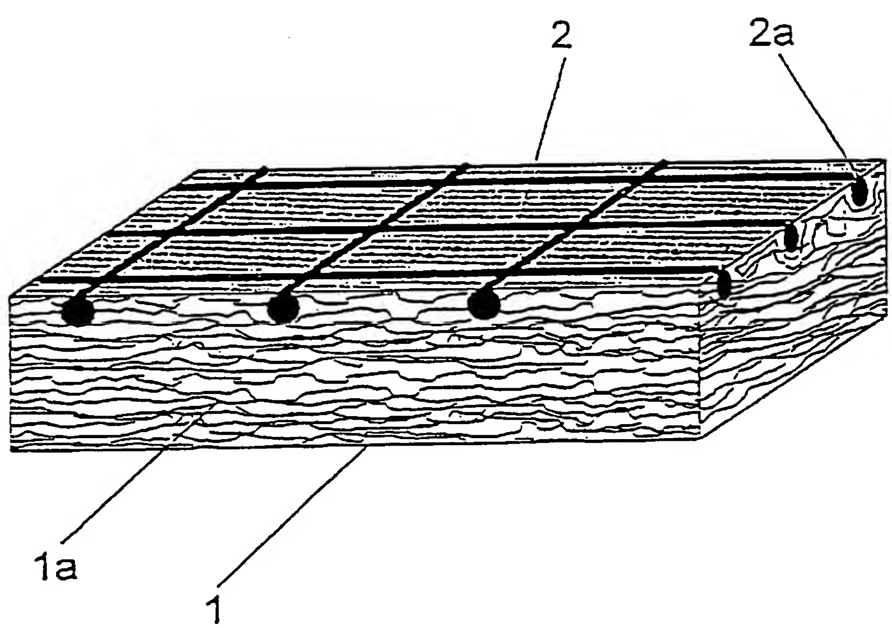
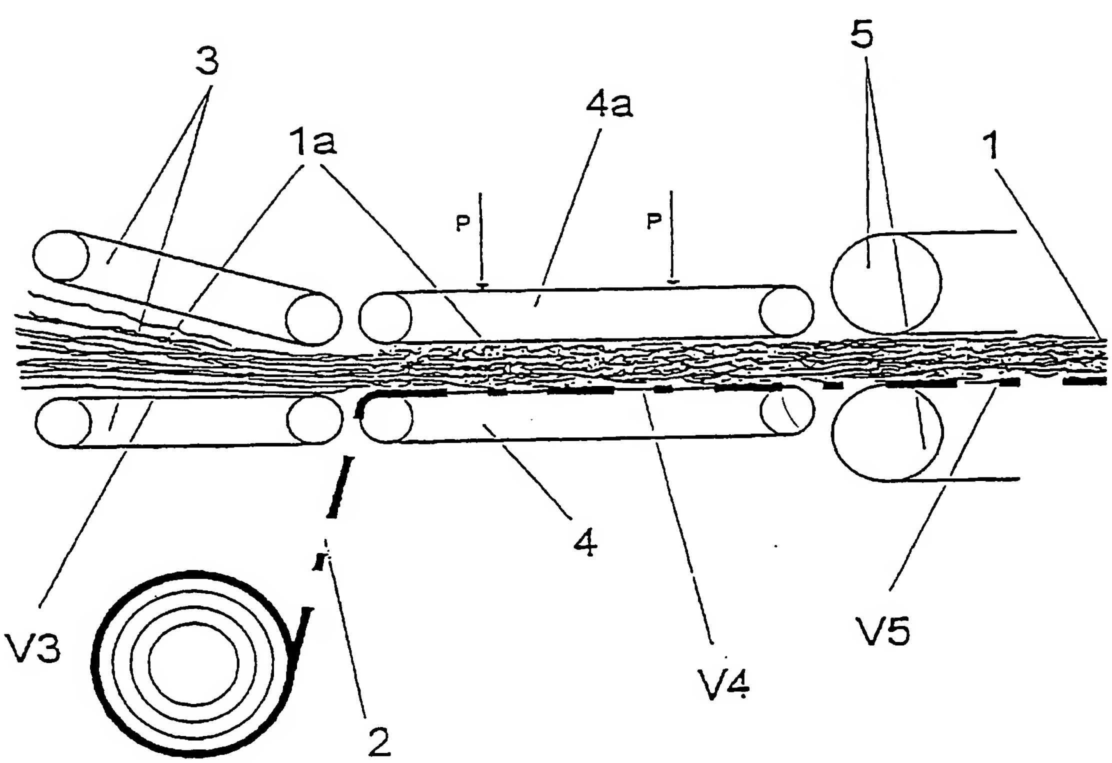


Fig. 2



INTERNATIONAL SEARCH REPORT

Intern   al Application No
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A. CLASSIFICATION OF SUBJECT MATTER
IPC 6   D04H13/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6   D04H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB,A,1 504 834 (ROCKWOOL) 22 March 1978 see claims 1-31 ---	1-6
X	CH,A,597 453 (NOLCO) 14 April 1978 see column 1, line 39 - column 4, line 8 -----	1-6

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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CH-A-597453	14-04-78	NL-A- 7412505	25-03-76